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Female Work Experience, Employment Status, and Birth Expectations: Sequential Decision-Making in the Philippines

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FEMALE WORK EXPERIENCE, EMPLOYMENT STATUS, AND BIRTH EXPECTATIONS: SEQUENTIAL DECISION-MAKING IN THE PHILIPPINES

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The purpose of this paper is to explore the relationship between the labor-market experience and fertility of women in the Philippines by examining the interactions between female work experience, current labor-force activity and birth expectations within a generalized sequential decision-making framework. Past studies of the female employment-fertility relationship in less-developed countries have for the most part focussed on the simple or partial relationship between the current employment status or labor-force participation of wome and their retrospective fertility which, as has been generally recognized by the authors, does not provide sufficient information regarding a crucial policy question-whether or not increasing female employment will reduce family size (Carleton, 1965; Goldstein, 1972; Gendell, Marviglia , and Kreitner, 1971; Jaffe, 1959; Knodel and Prachuabmoh, 1973; Stycos and Weller, 1968; Sweet, 1971).

We attempt to show that the utilization of a sequential choice framework extended to take into account the accumulation of market skills by women who work and the jointness of labor-force participation and birth decisions provides a potentially better method of understanding and measuring the impact of female employment-creation on fertility and imp roves our ability to predict among older couples who will have additional children.

The fundamental notion underlying the general hypothesis that fertility decisions should be viewed as a sequential process is that the birth of each child alters parental perceptions in a way not entirely anticipated, causing a reevaluation of initial decisions at each parity. (Mishler and Westoff, 1966; Namboodiri, 1973). Thus it is presumed useful in empirical studies based on this perspective to examine decisions to have an additional child by birth parity (Davidson, 1972; Namboodiri, 1973; Simon, 1975a and 1975b). However there is evidence which strongly suggests that past employment as

well as fertility behavior may also alter current decisions regarding births, since as emphasized in the economic theory of human capital (e.g., Becker, Ben-Porath, 1967) and has been demonstrated in a number of studies based on developed country data (Malkiel and Malkiel, 1974; Mincer and Polachek, 1974) the level of past work experience is a significant determinant of the wage rates received by women currently. Thus, a major component of the opportunity cost of bearing children will tend to increase over the life-cycle and vary according to how much a women has worked in previous periods. Given that a woman's potential wage and the number of children living in the household influence the extent of her current participation in the market (Bowen and Finegan, 1969) and that market employment and child-rearing may be competitive female activities, these findings together suggest that current decisions regarding whether to have additional children and whether or not to enter the labor market may be jointly influenced not only by the number of children already born (or still living) but by the amount of human capital accumulated by women after completing their schooling.

One consequence of the accumulation of work experience and skills by women over the life cycle is that female schooling attainment may be a less reliable indicator of the opportunity cost of an additional birth among older women who have had a greater opportunity for employment, especially if in addition school-produced market skills atrophy. Moreover, because disparities in work histories are likely to be greater for older than for younger women, the omission of work experience variables from fertility regression equations, say, may result in the explanatory power of socioeconomic variables being significantly reduced for older cohorts of women, as in Snyder, 1974. The effects of

socioeconomic characteristics on birth expectations or fertility may also appear to differ significantly by parity and age (Namboodiri, 1973, Rosenzweig and Seiver, 1975) or work status (Simon, 1975) when differences in female work histories are neglected due to the probable high (negative) correlation between birth parity and the past employment of women.

In a more general but simplified sequential framework, whether or not a woman expects to bear additional children at age i B_i (1 = yes, 0 = no) and how much she participates in the labor market L_i will be (age-specific) functions of the existing stock (and/or composition) of children C_i, the accumulated stock of wage-augmenting work experience E_i at age i and a vector of characteristics of the household which remain constant throughout the marriage X_B and X_L,

$$(1) \qquad B_i = f_i\ (C_i,\ E_i,\ X_B)$$

$$(2) \qquad L_i = g_i\ (C_i,\ E_i,\ X_L)$$

where

$$C_i = \sum_{j=0}^{i} B_j$$

$$E_i = \sum_{j=0}^{i} \alpha_j\ L_j$$

a_j = proportion of working time at age j allocated to improving market skills.

If women with a higher E_i are able to earn higher wage rates, it would be expected that $\delta L_i/\delta E > 0$ and $\delta B_i/\delta E_i < 0$ for given C_i, X_L, X_B.

To obtain more precise and detailed "predictions" would require a more complex and detailed model of sequential choice that is beyond the scope of this exercise. This framework, however, which highlights the distinction between variables representing current decisions (or expectations) and variables embodying the results of past and currently unalterable behavior, makes it clear that measuring the (simple or partial) "influence" of current female employment status on children ever born is an innapropriate means of discerning the impact of the encouragement of female employment on fertility since C_i represents the culmination of past fertility behavior and is more likely a determinant of L_i. In the next sections, this framework is applied to household data from the Philippines which contains information on the work histories of women. It is shown that Philippino women with greater work experience earn significantly higher wages, that work experience bears a similar positive relationship to their current labor force status, that family size has a significant negative impact on women's decisions to participate in the labor market, and that both parity and work experience for women in the older age groups significantly influence birth expectations.

The Data

To test for the relationships between current work status, work experience, and birth expectations, data extracted from the 1973 National Demographic Survey of the Philippines, a countrywide representative sample of 8,434 households conducted by the Philippines Population Institute, are utilized. The sub-sample of households used in this study is restricted to those of married women aged 15-44 in which both spouses are present and neither has been married more than once. The size of this sub-sample ranges from 3563 to 1814

women, depending on the number and quality of the variables utilized. Of these women approximately 85 percent indicated that they had heard of or had used either of five contraceptive devices (pill, foam, foam tablets, I.U.D., condom), and 22 percent reported that they were using or had used at least one contraceptive method.

Table 1 displays selected characteristics of the women in the sample by duration of marriage stratified according to whether the husband reported that his main work activity was agricultural. If the values of the duration-specific characteristics of the cross-sectional sample of Philippino women roughly correspond to those of a cohort of women observed over time, the accumulation of work experience and children with marital duration is clearly displayed for all sample groups, with the farm women exhibiting a somewhat greater lifetime work commitment and higher fertility. By no means are all women accumulating employment experience, however, as 40 percent of the women in the highest duration group had worked less than a year during their 26-30 years of marriage.

The pattern of current labor-force participation, defined as working for pay, appears to be U-shaped in the total and non-farm populations but displays no apparent pattern among farm women, more of whom appear to work for pay in the later marital stages than do non-farm women. Not surprisingly, however, a greater proportion of non-farm Philippino women are employed outside the household then are farm women but non-household employment appears to increase with length of marriage for all groups.

Table 2 presents the number of children ever born to women at different 5-year stages of marriage according to 1) current employment status, defined

Table 1

Percent Married Women Currently Employed, Employed Outside the Household, Mean Years of Marital Work Experience, Mean Children Ever Born by Duration of Marriage: Total, Non-Farm, Farm Populations

Years of Marriage	1-5	6-10	11-15	16-20	21-25	26-30
			Total (3563)[a]			
Percent Employed	8.2	16.3	19.6	17.9	15.2	14.7
Percent Employed Outside Household	2.8	3.9	4.8	5.0	5.6	7.9
Years Work Experience	0.75	2.10	2.79	4.12	5.17	6.19
Children Ever Born	1.74	3.48	4.96	6.27	7.18	7.13
			Non-Farm (1782)			
Percent Employed	10.8	16.7	18.3	20.8	13.3	10.8
Percent Employed Outside Household	3.9	4.6	6.0	7.9	7.4	8.0
Years Work Experience	0.75	2.16	2.91	4.23	4.84	5.34
Children Ever Born	1.74	3.37	4.81	6.12	6.88	6.76
			Farm (1781)			
Percent Employed	5.9	14.7	20.6	13.2	17.6	20.6
Percent Employed Outside Household	1.6	2.8	3.6	2.6	4.1	7.5
Years Work Experience	0.74	2.04	2.68	4.02	6.11	6.91
Children Ever Born	1.74	3.61	5.06	6.40	7.39	7.46

Source: 1973 Philippines NDS data tape.

[a]Figure in parentheses represents size of sample.

Table 2

Children Ever Born by Current Employment Status, Work Experience, and Duration of Marriage-Total, Non-Farm, Farm Populations

Years of marriage[a]	Employed Outside Household		Work Experience	
	No	Yes	Low	High
		Total		
1-5 (3)[a]	1.737	2.400 (539)[b]	1.500	1.593 (129)[b]
6-10 (8)	3.477	3.267 (770)	3.417	3.255 (162)
11-15 (13)	4.958	4.583 (747)	5.184	4.764 (169)
16-20 (18)	6.268	5.273 (661)	6.206	5.868 (155)
21-25 (23)	7.176	7.929 (499)	7.105	6.711 (111)
26-30 (28)	7.128	7.333 (340)	6.980	5.400 (64)
		Non-Farm		
1-5 (3)	1.737	2.545 (304)	1.574	1.722 (72)
6-10 (8)	3.365	3.100 (426)	3.431	3.323 (89)
11-15 (13)	4.843	4.409 (360)	4.913	4.500 (74)
16-20 (18)	6.117	5.600 (315)	6.038	5.481 (79)
21-25 (23)	6.878	7.750 (213)	7.621	6.375 (45)
26-30 (28)	6.757	7.308 (161)	6.143	5.700 (31)
		Farm		
1-5 (3)	1.736	2.000 (235)	1.417	1.333 (57)
6-10 (8)	3.614	3.600 (344)	3.393	3.176 (73)
11-15 (13)	5.062	4.857 (387)	5.368	5.037 (95)
16-20 (18)	6.396	4.250 (346)	6.380	6.269 (76)
21-25 (23)	7.391	8.167 (286)	6.800	7.048 (66)
26-30 (28)	7.461	7.357 (178)	7.630	5.167 (33)

Source: 1973 Philippines NDS data tape

[a]Figure in parentheses refers to number of years of marriage for the work experience tabulations. See text.

[b]Figure in parentheses represents sample size.

to maximize the conflict between child-rearing and employment, according to whether or not the woman was working for pay away from the household, and 2) by whether or not the women's past employment experience exceeded the mean for her duration group. Because both years of work and births are positively correlated with duration of marriage, single-year marital groups (in parentheses) were used for the latter comparisons. The sample was again stratified by the agricultural activity of husbands.

As indicated in the previous section, work status tabulations are not informative with regard to the relationship between fertility and female employment; they are presented here for comparative purposes only. The work status patterns displayed are similar to those found in Goldstein (1972) based on household data from Thailand--'economically active' women in the younger duration cohorts (6-20) exhibit significantly lower fertility than their 'non-active' counterparts but these fertility differentials are reversed for the older groups (21-30). This pattern is replicated in both the farm and non-farm households in the Philippines data.

Contrary results are obtained with respect to work experience and fertility. Here in the two oldest duration cohorts, where disparities in work histories are widest, fertility is significantly lower for women with above-average employment experience. These findings are merely suggestive, however, since both variables are the product of past behavior and sequential fertility and labor-force participation decisions. Moreover, characteristics which may be correlated with female employment and fertility are not controlled for in these tables.

Female Work Experience and Earnings

In order to demonstrate that a woman's past employment experience has a direct economic effect on her current employment and fertility behavior in the Philippines it is necessary first to establish that Philippino women who have spent a greater amount of their time in the labor market in the past receive, ceteris paribus, higher wage rates currently. An ordinary least squares (OLS) multiple regression analysis is thus applied to a sample of working married women aged 15-59 who reported that they had received income in the past month. The dependent variable used, the natural logarithim of the hourly wage, was computed by dividing the value of income received in cash and/or in kind during the year by the number of hours worked in the month (= days worked in the month multiplied by hours per day) multiplied by twelve. The independent variables consist of the number of years the wife has attended school, her age, whether or not she was engaged in agricultural work (= 1 if farm, = 0 if non-farm), the number of years worked prior to the date of the survey interview, and the number of years of work experience squared. The latter quadratic variable was employed to test for the non-linearities found by other researchers in wage regressions applied to U.S. data (Malkiel and Malkiel, 1974; Mincer and Polachek, 1974). It is important to note, however, that the work experience variable employed is an imperfect proxy for the level of market skills acquired by women on the job since, among other reasons, the distribution or discontinuity of employment over the life-cycle as well as the total number of years worked, the only variable provided in the data, may importantly affect current productivity (Mincer and Polachek, 1974). Thus, the coefficients of the experience variables

may be biased toward zero. The regression results are provided in equation (3).

(3) $$\ln \text{Wage} = -1.64 + \underset{(.005)}{.056^{*}}\ \text{schooling} + \underset{(.006)}{.055^{*}}\ \text{experience} - \underset{(.0002)}{.0015^{*}}\ (\text{experience})^{2}$$
$$+\underset{(.0019)}{.0087^{*}}\text{age} + \underset{(.065)}{.302^{*}}\ \text{farm}$$

R^2 (adj) = .092 n = 2503

(standard errors in parentheses)

*significant at the 1 percent level

All the coefficients are statistically significant, with both female schooling and work experience contributing positively to the wages women earn. The coefficient values indicate that an increase in work experience of one year is associated with a 5 percent increase in female wages, evaluated at the sample means, the returns to experience diminishing as the level of work experience rises. Thus it appears that among women of the same age and formal schooling, those who have greater work experience do earn more when employed. However, the estimated coefficients, obtained from a sample of working women, may differ from those relevant to the non-employed women excluded from the sample. Moreover, these findings must be interpreted with caution because it may be that women who expect to earn higher wages in the future both attend school and participate in the labor market for longer periods of time, thus creating a spurious positive correlation between wages earned and the schooling and experience variables. While attempts to construct the simultaneous equations system required to solve this problem are beyond the scope of this paper, a future research need in this area is to identify factors that have influenced women to work in the past that are not presently correlated with their current wages.

Work Experience, Children and Current Employment

In this section we attempt to apply equation (2) to the data in order to show that accumulated work experience and family size importantly influence current decisions regarding whether women seek market work. The superior empirical procedure, the division of the sample into cells according to all the relevant characteristics of the households and the measurement within cells of the relationship between parity, work experience and the wife's current labor-force participation, is not utilized because the size of the total sample, the number of socio-economic and demographic control variables, and the ubiquitous missing variables problem result in too many empty cells. Instead OLS multiple regression, which unfortunately imposes a linear structure to the model, is again used. To test for potential non-linearities and interaction affects a limited number of quadratic and first-order interaction terms are also tried.

The dependent variable is the number of hours women worked for pay in the month preceding the survey interview. As 85 percent of the women worked no hours (for pay), the usual OLS assumption that the dependent variable is distributed normally is probably violated, which may bias the results (Amemiya, 1973). Results obtained utilizing a dichotomous variable and employing the generalized least squares procedure described in the next section were qualitatively identical to those reported below, however.

The independent variables employed, aside from family size (number of live children) and work experience,are wife's age,wife's age at marriage, wife's years of schooling, husband's age, husband's schooling, husband's potential wage, the child mortality rate of the province in which the family resides,

contraceptive knowledge (= 1 if the wife has heard of or used the five methods listed in section II, = 0 otherwise), While it would be expected that the potential wage of the wife would also be an important determinant of her decision to work, equation (3) is not utilized to impute a potential wage to women who are not working, since the coefficients obtained from the sample of working women may not provide an unbiased prediction of the price of time of non-workers (Gronau, 1974). Instead, a reduced-form equation is utilized in which the determinants of the potential wage are entered directly in the work activity equation. The female age, education, and work experience variables should therefore display effects in the labor-force participation equation qualitatively similar to those exhibited in equation (3) as long as the non-economic influences embodied in these variables are not strong.

The expected wage of the husband is an instrumental variable obtained from an auxiliary OLS multiple regression in which the natural logarithim of the computed hourly wage of working husbands is regressed against the husband's schooling attainment age, age squared, and occupation and the schooling level of the husband's father. Since the higher the husband's earnings, the greater household income and thus the greater the household demands on the time of the wife, the coefficient of the husband's wage variable should exhibit a negative sign. The effects of the husband's age and schooling on the employment of the wife in the presence of the male wage variable, however, cannot be stated a priori.

The number of children in the household would also be expected to exert an inhibitive effect on the wife's market employment, provided that older children do not readily substitute for the mother in child-care. The age-composition of children may thus also be an important determinant of the wife's

current participation in the labor market, but this variable is omitted in this study. Sweet (1971) has found, however, that the number of children in the family significantly reduces current female employment whether or not compositional effects are accounted for.

The coefficient sign of the dummy variable representing farm status would be expected to be negative, since women whose husbands are engaged in farming may be more likely to be employed as unpaid family workers. The child mortality coefficient should display a negative sign in the employment equation as well since women in an environment of high child mortality might refrain from participating in the labor market in order to bear more children, as indicated by the positive regional and individual correlation between infant mortality and children ever born obtained by Harman (1970) in his study of 1968 Philippines household data.

Women with a knowledge of contraceptive techniques may work more because of their potentially superior control over current fertility while wife's age at marriage may have a negative coefficient if women of the same age who have postponed marriage attempt to "catch up" by bearing more children in a fewer number of years.

Table 3 contains the parameters estimated using OLS multiple regression. No significant first-order age or parity interaction effects were found and thus only linear specifications are reported (except for regression (4)). In addition, the family size and work experience variables are entered in a step-wise manner in order to assess the degree of specification bias created by the omission of these life-cycle variables.

Table 3

Regression Coefficients: Hours Worked in Month, Married Women Aged 15-44[a]

Independent Variables	Regression Number (1)	(2)	(3)	(4)
Age at Marriage	-.8709*	-1.563*	-.5328	-1.040*
	(.3685)	(.4154)	(.3822)	(.3729)
Age of Wife	1.698*	2.410*	.9577*	1.1883*
	(.3112)	(.3687)	(.3426)	(.3329)
Education of Wife	3.392*	3.321*	2.528*	2.122*
	(.5163)	(.5155)	(.4724)	(.4594)
Education of Husband	.5347	.5529	.3826	.4065
	(.4796)	(.4786)	(.4374)	(.4245)
Expected Wage of Husband	-.0007*	-.0007*	- .0006*	-.0006*
	(.0002)	(.0002)	(.0002)	(.0002)
Age of Husband	-.1296	-.1419	-.1100	-.0704
	(.2425)	(.2421)	(.2212)	(.2147)
Child Mortality	.0779*	.0717*	.0081	.0249
	(.0300)	(.0300)	(.0276)	(.0268)
Contraceptive Knowledge	-15.593*	-14.637*	-3.785	-4.005
	(3.762)	(3.763)	(3.469)	(3.368)
Farm	-5.988*	-5.654*	-8.696*	-8.846*
	(2.910)	(2.905)	(2.658)	(2.580)
Live Children		-2.728*	-1.859*	-1.957*
		(.7608)	(.6962)	(.6758)
Work Experience			5.412*	12.671*
			(.2299)	(.5936)
Work Experience Squared				-.4293*
				(.0325)
R^2 (adj.)	.076	.081	.232	.277
F-ratio	24.25*	23.31*	71.77*	83.74*
d.f.	2805	2804	2803	2802

[a]Standard errors are in parentheses.

*Significant at .05 level, two-tailed test.

Source: 1973 Philippines NDS data tape.

In regression (1), with children and work experience omitted, all the coefficients of the included variables are statistically significant except for husband's age and schooling and all but those of the child mortality and contraceptive knowledge variables display the predicted signs. The coefficients of the latter two, however, lose their statistical significance when both the children and experience variables are entered in the complete specification (4).

The number of live children, entered in regression (2), appears to have a statistically significant negative impact on the current employment status of women as expected, controlling for demographic and socioeconomic characteristics and despite the low simple correlation (.0051) between these variables. Work experience, included in regression (3), also has the predicted (positive) effect and its coefficient is statistically significant. Moreover, the addition of the work experience variable in (3) almost triples the explanatory power of the equation, after adjusting for the decrease in degrees of freedom, and significantly reduces the coefficients of the female education, child mortality and contraceptive knowledge variables. The exhibited relationship between work experience and current female employment is quite strong--at the mean (2.7 years), women with one more year of work experience work an additional 11.5 hours per month or approximately 40 percent more in the current period. The addition of one child to the household, however, appears to reduce the labor-force participation of the wife by approximately two hours per month or by seven percent.

These results are consistent with the hypothesis that the number of children a woman has had and her past employment experience are important

correlates of her current labor-force behavior. In conjunction with equation (3), they also support the more specific economic hypothesis that among women who are otherwise similar, those who have been employed in the market longer in previous years work more currently because their opportunity cost of not working (potential wage rate) is higher. A competing hypothesis, also consistent with the results of regression (3), is that the coefficient of the work experience variable is picking up the effects of unobserved or omitted variable such as tastes, which are correlated with both current and past labor-force behavior. That is, the influence of unobserved variables which may have generated the difference in work experience among women with identical observed characteristics in the past may persist, i.e., be serially correlated. However, an additional implication arising out ot the "price of time" but not from the 'omitted variables' hypothesis is that the magnitude of the positive effect of work experience on labor-force activity will decrease with the level of work experience since, as indicated in (3), the wife's potential wage is a positive but decreasing function of experience. As a further test, therefore, a quadratic experience term is added in regression (4). As in (3), the coefficient of this variable is negative and highly significant while the coefficient of the linear experience term retains its positive sign and significance. The replication of the non-linear experience effect in the labor-force and wage equations thus tends to favor the "price of time" hypothesis; the coefficients, however, may still overestimate the impact of increasing female work experience on labor-force decisions in the current period due to the impossibility of eliminating the serial correlation problem with the data available(Heckman and Willis, 1975).

Table 4 reports on regressions run on three sub-samples of women, stratified according to age, using the final, quadratic specification of Table 3. Although the sub-sample coefficient estimates are measured with less precision, the set of variables in each equation "explains" a statistically significant proportion of the variance in the monthly hours worked by women. The hypothesis that the set of coefficients estimates are not statistically different, however, is rejected at the 5 percent level ($F(2815,13) = 2.52$), indicating significant age interaction effects. In particular, the number of live children appears to exert a much stronger negative effect on the mother's current labor force participation in the 25-34 year age group than in the younger or older cohorts. This apparent non-linearity, which would not be captured by a first-order age-parity interaction term, may be due to the omission of variables representing the age-composition of children, however.

The net influence of work experience on current participation is positive, non-linear and statistically significant for all three cohorts, as indicated in Table 3 for the whole sample. While the experience <u>coefficients</u> appear dissimilar across equations, the mean elasticities (η_i's), computed according to equation (4) to take into account differences in the average years of experience and mean hours of work by age, are

$$\eta_i = \left(\frac{\partial \text{hours}}{\partial \text{exp}}\right)_i \frac{\text{exp}_i}{\text{hours}_i} = b_{\text{exp}_i} \frac{\text{exp}_i}{\text{hours}_i} + 2b_{(\text{exp}_i)^2} \frac{(\text{exp}_i)^2}{\text{hours}_i}$$

$= .96$ $\quad i = 15\text{-}44$

$= 1.01$ $\quad i = 15\text{-}29$

$= .93$ $\quad i = 25\text{-}34$

$= .97$ $\quad i = 35\text{-}44$

where b_{exp_i} = coefficient of linear work experience variable in age group i

Table 4 Regression Coefficients:

Hours Worked in Month by Age Groups[a]

Independent Variables	Age Cohort 15-24	25-34	35-44
Age at marriage	-.4809	-2.106*	0.6986
	(1.382)	(.6122)	(.5498)
Age of wife	.6003	2.916*	1.327
	(1.514)	(.7519)	(.8053)
Live children	-2.615	-4.081*	-1.169
	(2.739)	(1.169)	(.9629)
Education of wife	1.945*	2.133*	2.193*
	(1.012)	(.6671)	(.7818)
Education of husband	-1.599*	.3960	.7501
	(.8333)	(.6132)	(.7513)
Expected wage of husband	-.0004	-.0006*	-.0006*
	(.0004)	(.0003)	(.0003)
Age of husband	.4772	.2033	1.327
	(.4693)	(.3230)	(.8053)
Child mortality	.0119	.0021	.0561
	(.0525)	(.0383)	(.474)
Contraceptive knowledge	9.288	.2295	-5.136
	(6.467)	(4.961)	(5.843)
Farm	-9.161*	-9.040*	-8.649*
	(4.694)	(3.661)	(4.760)
Work experience	22.498*	14.079*	11.905*
	(3.578)	(1.047)	(.9431)
Work experience squared	-2.356*	-.5337*	-.3894*
	(.5522)	(.0741)	(.0475)
R^2(adj.)	.133	.294	.268
F-ratio	5.93*	41.50*	32.47*
d.f.	411	1256	1107

[a]Standard errors are in parentheses.

*Significant at .05 level, two-tailed test.

Source: 1973 Philippines NDS data tape.

$b_{(exp_i)^2}$ = coefficient of quadratic work experience variable in age group i

exp_i, $hours_i$ = mean hours, work experience for women in age group i

markedly similar, indicating that a 10 percent increase in years of work experience is associated with a 10 percent rise in the current hours of female employment for all three age groups in the sample.

Work Experience, Parity, and Birth Expectations

To test for the relationship between the accumulated work experience of women and their subsequent fertility within a sequential decision-making framework, work history data is required which corresponds to that supplied in a pregnancy roster, i.e., the amount of time spent by women in the labor market within each birth interval. With such data, a parity-progression on birth-order transition analysis utilizing female work experience could be performed, as in Simon (1975a, 1975b). The 1973 Philippines National Demographic Survey, however, provides information only on the total number of years worked by women (and worked during marriage) as of the data of the sample survey. It is impossible, therefore, to directly ascertain how a women's past employment history affects her actual subsequent fertility with this data set. Information is provided, however, on the number of additional births expected by women, also as of the date of the survey, which may be used as an indication of future fertility plans. Birth expectations are thus related to birth parity and female work experience as well as other socioeconomic variables in a multiple regression analysis to test if the accumulation of market skills by women influences birth decisions sequentially.

The dependent variable used to represent the decision to have an additional child is dichotomous, equal to 1 if the woman expects to have one or more additional children and to 0 if she expects no additional births. Because this variable is not distributed normally, violating an assumption of OLS regression analysis, the generalized least-squares procedure described by Goldberger (1964, pp. 249-250) is employed to obtain unbiased coefficient standard errors. The sample used is additionally restricted to married

women aged 15-44 who had had at least one birth and who provided infomrmation on expected children.

The set of independent variables is identical to that used in the preceding labor-force participation regressions with the addition of age-schooling (of the wife), and age-parity interaction terms, the former used to test for the hypothesized weaker schooling effect among older women discussed in the first section. The expected qualitative influence of many of the variables in the birth expectations equation would, however, in general be opposite to those effects obtained in the labor-force regressions. For instance, it would be expected that wife's schooling would have a negative influence on additional births, since wife's schooling is a correlate of one component of her value of time, as indicated by equation (3), and is positively related to her current participation in the labor market (Table 3). We would also expect the level of child mortality in the municipality to have a positive and contraceptive knowledge a negative effect on additional births. The net effect of parity (live children) on birth expectations is notunambiguous, however. If the set of independent variables successfully captures all the other influences on current fertility decisions, it would be expected that among women with the same characteristics, those with more live children would expect less additional births. If the omitted variable problem is serious, the coefficient of live children will instead pick up the positive influence of omitted variables--among women with identical observed characteristics, those who have had more births in the past would also expect to have a greater number of additional births. As we are primarily interested, however, in testing if women with larger amounts of work experience tend to expect less births, a more detailed discussion of the other variable coefficients is beyond the scope of this paper.

The birth expectations regression results obtained form the total sample are presented in Table 5. In regression (1) of Table 5, containing all the independent variables except work experience, all coefficients except that of the predicted

Table 5

Regression Coefficients: Expecting Additional Children, Married Women Aged 15-44[a]

Independent variables	Regression Number (1)	(2)	(3)	(4)	(5)
Age at Marriage	.0130	.0129	.0121	.0143	.0133
	(.0109)	(.0109)	(.0109)	(.0108)	(.0108)
Age of Wife	-.0957*	-.0959*	-.0959*	-.0968*	-.0947*
	(.0158)	(.0158)	(.0158)	(.0158)	(.0158)
Live Children	-.4048*	-.4047*	-.4022*	-.4144*	-.4489*
	(.0839)	(.0839)	(.0839)	(.0836)	(.0851)
Age of Wife x Children	.0097*	.0097*	.0096*	.0101*	.0109*
	(.0023)	(.0023)	(.0023)	(.0023)	(.0023)
Education of Wife	-.1359*	-.1361*	-.1328*	-.1242*	-.1239*
	(.0474)	(.0474)	(.0475)	(.0471)	(.0471)
Education of Wife x Age of Wife	.0029*	.0029*	.0028*	.0026*	.0026*
	(.0014)	(.0014)	(.0014)	(.0013)	(.0013)
Education of Husband	.0025	.0024	.0025	.0023	.0011
	(.0126)	(.0126)	(.0126)	(.0125)	(.0125)
Expected Wage of Husband	-.0000	-.0000	-.0000	-.0000	-.0000
	(.0000)	(.0000)	(.0000)	(.0000)	(.0000)
Age of Husband	.0072	.0072	.0071	-.0079	-.0080
	(.0066)	(.0066)	(.0066)	(.0066)	(.0066)
Child Mortality	.0009	.0009	.0009	.0009	.0010
	(.0008)	(.0008)	(.0008)	(.0008)	(.0008)
Contraceptive Knowledge	-.4595*	-.4591*	-.4567*	-.4666*	-.4576*
	(.1040)	(.1040)	(.1040)	(.1041)	(.1041)
Farm	.0481	.0487	.0458	.0409	.0352
	(.0783)	(.0783)	(.0783)	(.0779)	(.0779)
Monthly Hours		.0003	-.0069		
		(.0008)	(.0049)		
Monthly Hours x Age of Wife			.0002		
			(.0002)		
Work Experience				.0090	.1073*
				(.0067)	(.0476)
Work Experience x Age of Wife					-.0028*
					(.0012)
R^2(adj)	.108	.108	.109	.109	.110
F-ratio	17.87*	16.60*	15.65*	16.83*	16.03*
d.f.	1801	1800	1799	1823	1822

[a]Observations weighted by $[\hat{Y}_i(1-\hat{Y}_i)]^{-1/2}$, where the $\hat{Y}_i$ are the predicted values of the dependendent variable obtained from OLS regressions. Standard errors are in parentheses.

*Signficant at .05 level, two-tailed test.

Source: 1973 Philippines NDS data tape.

husband's wage display signs consistent with expectations and those of wife's age, number of live children, wife's schooling, contraceptive knowledge, and the age-parity and age-education variables are statistically significant. More importantly, the positive sign of the coefficient of the latter interaction variable is consistent with the hypothesis stated in the first section that the negative effect of the wife's schooling on fertility would be less strong for older than for younger women since among the former work experience may dominate schooling as a proxy for the wife's value of time. In addition, the net negative effect of live children on birth expectations indicates that family size does influence sequential birth decisions and does not simply reflect, for example, "tastes" for children.

The number of hours worked for pay by women in the month preceding the sample survey is added in regression (2) to test if the wife's current labor-force participation affects her birth expectations. The monthly hours coefficient, however, displays the wrong sign and is statistically insignificant. In regression (3), monthly hours is interacted with the age of the wife to see if the birth expectations effect of curren employment status varies with age. The signs of the linear and interaction coefficients do differ, but neither is statistically significant. These results thus suggest that whether or not the wife is currently in the labor market has little influence on her decisions to bear additional children, controlling for other socio-economic and demographic characteristics.

In regression (4), the number of years the wife has worked appears also to exert no significant effect on birth expectations. However, when the wife's age and work experience are interacted in regression (5), the coefficients of both the linear and interaction work experience variables attain statistical significance. Moreover, the coefficient values indicate that only for women above age 37 does work experience have the expected negative association with birth expectations. This result is not only

consistent with the simple duration-specific family size-work experience relations depicted in Table 2, but also further confirms the hypothesis that work experience is a more important component of the opportunity cost of female time than schooling for older women and than work experience for younger women.

To obtain more precise estimates of the age-experience and age-education differentials, the sample of women is sub-divided into three age-groups and regressions similar to (5) of Table 5 are run within each group. We would expect on the basis of regression (5) that work experience would only have a significant negative effect on expected births among women in the oldest cohort and that the wife's schooling coefficient should be smallest for this age group.

The regression results for the sub-samples are reported in Table 6. Because of the reductions in sample sizes, the coefficients are measured with considerably less precision. Indeed, none of the coefficients attain statistical significance in the 15-24 year old group of women, although the equation as a whole is statistically significant. Most importantly, the coefficient values in each age group, while qualitatively consistent with those obtained for the whole sample, differ significantly ($F(1822,15) = 3.15$) at the 5 percent level in the manner indicated by the interaction variables. The results confirm the hypothesis that the wife's schooling is a less good and work experience a better proxy for the value of the wife's time among older women. The number of years worked by women, as expected, has a statistically significant effect only in the 35-44 year old cohort, of whom 17 percent expect additional births, exerting a negative influence on birth expectations for women above age 36. In addition, the (negative) effect of the wife's schooling on expectations of additional births is considerably less strong in the most mature age-group than in the two younger cohorts of women.

Table 6

Regression Coefficients: Expecting Additional Children by Age Cohorts[a]

Independent variables	Age Cohort 15-24	25-34	35-44
Age at Marriage	0.0640	.0089	.0062
	(.0612)	(.0219)	(.0115)
Age of Wife	-.1430	-.1599*	-.0560
	(.1660)	(.0688)	(.0498)
Live Children	-.6594	-.7142	-.3072
	(1.135)	(.3779)	(.2566)
Age of Wife x children	.0067	.0195	.0073
	(.0508)	(.0123)	(.0065)
Education of Wife	-.3351	-.3724*	-.0990
	(.3965)	(.1553)	(.1440)
Education of Wife x Age of Wife	.0146	.0106*	.0019
	(.0174)	(.0052)	(.0036)
Education of Husband	.0357	.0074	.0021
	(.0379)	(.0214)	(.0156)
Expected Wage of Husband	-.0000	-.0000	-.0000
	(.0000)	(.0000)	(.0000)
Age of Husband	.0156	.0083	-.0138
	(.0193)	(.0110)	(.0083)
Child Mortality	.0001	.0020	.0007
	(.0023)	(.0015)	(.0011)
Contraceptive Knowledge	-.3149	-.9139*	-.1110
	(.2786)	(.1891)	(.1261)
Farm	.2654	-.0469	.0769
	(.1967)	(.1342)	(.1023)
Work Experience	.2990	.2283	.3040*
	(.7365)	(.1790)	(.0882)
Work Experience x Age of Wife	.0128	-.0079	-.0084*
	(.0334)	(.0058)	(.0022)
R^2 (adj)	.064	.060	.031
F-ratio	2.22*	4.26*	2.57*
d.f.	267	776	748

[a]Observations weighted by $[\hat{Y}_i(1-\hat{Y}_i)]^{-1/2}$, where the $\hat{Y}_i$ are the predicted values of the dependent variable obtained from OLS regressions. Standard errors in parentheses

*Significant at .05 level, two-tailed test

Source: 1973 Philippines NDS data tape.

Conclusion

The evidence considered here strongly suggests that both the accumulated work experience of women and birth parity are significant determinants of sequential decisions regarding fertility and employment behavior, particularly among women in the later stages of their child-bearing years. The use of a sequential-choice framework extended to take into account changes in the stock of human capital of women as well as in their stock of children over the life-cycle and the joint determination of fertility and labor force participation decisions supports the hypothesis that encouraging young women to enter the labor market in a developing country (the Philippines) would have an anti-natalist impact. Women who have worked more in previous years appear to both participate more fully in the labor market currently and to expect less additional births, controlling for the number of children already born and a large number of socioeconomic variables pertaining to the wife and husband. The opportunity cost of child-bearing--the returns to market work currently obtainable by the mother, importantly influenced by the skills acquired from previous jobs and from formal schooling--thus appears to be a significant determinant of sequential fertility and employment decisions. Failure to take into account the changing job skills of women over the life cycle and consequent variations in the opportunity cost of not working would appear to seriously bias empirical studies of sequential birth decisions.

The level of analysis in this paper is meant to be exploratory rather than conclusive, however, and the results obtained must be regarded with caution. In particular, the choice of estimating techniques was predicted on the implicit strong assumption that variables representing behavior occurring

prior to decisions related to birth expectations and current labor force participation are uncorrelated with omitted or unobserved variables also influencing these decisions. While the non-linear influence of female work experience on female labor-force participation, the net negative correlation of parity with birth expectations and the restriction of the significant negative association of work experience and birth expectations to older women suggest that the coefficients of the experience and children variables are not merely picking up these potential unobserved influences, serious consideration must be given to this problem in further studies. No less important is the need for a stronger theoretical model of sequential decision-making which considers jointly the timing and spacing of female employment, job choice, and fertility over the life-cycle.

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